

CLAIMS

1. A map providing apparatus that receives, from a portable terminal including at least a display unit, a piece of position information indicating a location point
5 of the portable terminal and transmits, to the portable terminal, a map image that corresponds to the received piece of position information, the map providing apparatus comprising:
- a reference direction specifying unit that specifies a
10 reference direction that is required when a user of the portable terminal brings the map image displayed on the display unit of the portable terminal into correspondence with actual directions, based on the piece of position information received from the portable terminal;
- 15 a reference direction information generating unit that generates a piece of reference direction information for having the user of the portable terminal understand the reference direction specified by the reference direction specifying unit; and
- 20 a transmitting unit that transmits the piece of reference direction information generated by the reference direction information generating unit to the portable terminal, together with the map image.
- 25 2. The map providing apparatus according to claim 1, wherein
- the reference direction information generating unit generates the piece of reference direction information as an image to be displayed, together with the map image, on
30 the display unit of the portable terminal.
3. The map providing apparatus according to claim 2, further comprising:

a map image editing unit that embeds the piece of reference direction information generated by the reference direction information generating unit into the map image, wherein

5 the transmitting unit transmits, to the portable terminal, the map image into which the piece of reference direction information has been embedded by the map image editing unit.

10 4. The map providing apparatus according to any one of claims 1 to 3, further comprising:

 a map direction specifying unit that specifies the map direction in the map image to be transmitted by the transmitting unit, wherein

15 the reference direction specifying unit specifies the reference direction with respect to the map direction specified by the map direction specifying unit.

20 5. The map providing apparatus according to any one of claims 1 to 4, wherein

 the target object is a shadow formed by sunlight, and
 the reference direction specifying unit specifies a shadow direction to which the shadow extends, based on a date and time at which the transmitting unit transmits the
25 piece of reference direction information and the piece of position information.

6. The map providing apparatus according to claim 5, further comprising:

30 a shadow direction table that shows, in correspondence, sets of a date and a time at each of which the transmitting unit transmits the map image and shadow directions for the sets of a date and a time, wherein

the reference direction specifying unit specifies the shadow direction that is in correspondence with the date and time by referring to the shadow direction table.

5 7. The map providing apparatus according to any one of claims 1 to 6, wherein

the target object is an astronomical object, and

the reference direction specifying unit specifies a direction of the astronomical object with respect to the
10 location point, based on the piece of position information and the piece of date and time information.

8. The map providing apparatus according to any one of claims 1 to 7, wherein

15 the target object is a landmark, and

the map providing apparatus further comprises a storing unit that stores therein a piece of position information that indicates a position of the landmark, and

the reference direction specifying unit specifies a
20 direction of the landmark with respect to the location point, based on the piece of position information of the landmark being stored in the position information storing unit and the piece of position information that indicates the location position and has been received by the
25 receiving unit.

9. The map providing apparatus according to claim 8, wherein

the position information storing unit stores therein a
30 plurality of landmarks including the landmark and pieces of position information each of which indicates a location point of a different one of the landmarks, while keeping the landmarks in correspondence with the pieces of

positional information,

the map providing apparatus further comprises a landmark selecting unit that selects, out of the position information storing unit, the landmark corresponding to the
5 piece of reference direction information that is to be transmitted to the portable terminal, based on the piece of position information of the portable terminal and the piece of position information of the landmark, and

the reference direction specifying unit specifies the
10 direction of the landmark selected by the landmark selecting unit.

10. The map providing apparatus according to claim 9, wherein

15 the landmark selecting unit selects the landmark based on the direction of the landmark with respect to the location point of the portable terminal.

11. The map providing apparatus according to claim 10, wherein

the transmitting unit transmits a map image showing a route to a destination desired by the user, and

the landmark selecting unit selects the landmark, further based on a direction of the destination with
25 respect to the location point of the portable terminal.

12. The map providing apparatus according to any one of claims 9 to 11, wherein

the landmark selecting unit selects the landmark,
30 based on a distance between the location point and the landmark.

13. A portable terminal on which a map image is to be

displayed, comprising:

- a receiving unit that receives the map image;
 - a reference direction specifying unit that specifies a reference direction that is required when the map image
5 received by the receiving is brought into correspondence with actual directions, based on a piece of position information that indicates a location point of the portable terminal;
 - a reference direction information generating unit that
10 generates a piece of reference direction information for having a user of the portable terminal understand the reference direction specified by the reference direction specifying unit; and
 - a display unit that displays the piece of reference
15 direction information generated by the reference direction information generating unit, together with the map image.
14. The portable terminal according to claim 13, wherein
the display unit displays the map image and the piece
20 of reference direction information simultaneously.
15. The portable terminal according to claim 13 or 14,
wherein
- the receiving unit further receives a piece of map
25 direction information that indicates a map direction that is a direction in the map image, and
 - the reference direction specifying unit specifies the reference direction with respect to the map direction, based on the piece of map direction information received by
30 the receiving unit.
16. A map providing method of receiving, from a portable terminal including at least a display unit, a piece of

position information indicating a location point of the portable terminal and transmitting, to the portable terminal, corresponding to the received piece of position information, the map providing method comprising:

- 5 specifying a reference direction that is required when a user of the portable terminal brings the map image displayed on the display unit of the portable terminal into correspondence with actual directions, based on the piece of position information received from the portable
- 10 terminal;
- generating a piece of reference direction information for having the user of the portable terminal understand the reference direction specified at the specifying; and
- transmitting the piece of reference direction
- 15 information generated at the generating to the portable terminal, together with the map image.

17. A map displaying method of displaying a map image on a portable terminal, the map displaying method comprising:

- 20 receiving the map image;
- specifying a reference direction that is required when the map image received at the receiving is brought into correspondence with actual directions, based on a piece of position information that indicates a location point of the
- 25 portable terminal;
- generating a piece of reference direction information for having a user of the portable terminal understand the reference direction specified at the specifying; and
- displaying the piece of reference direction
- 30 information generated at the generating, together with the map image.

18. A computer program for realizing a map providing

method of receiving, from a portable terminal including at least a display unit, a piece of position information indicating a location point of the portable terminal and transmitting, to the portable terminal, corresponding to
 5 the received piece of position information, on a computer, the computer program causing the computer to execute:

specifying a reference direction that is required when a user of the portable terminal brings the map image displayed on the display unit of the portable terminal into
 10 correspondence with actual directions, based on the piece of position information received from the portable terminal;

generating a piece of reference direction information for having the user of the portable terminal understand the
 15 reference direction specified at the specifying; and

transmitting the piece of reference direction information generated at generating to the portable terminal, together with the map image.

20 19. A computer program for realizing a map displaying method of displaying a map image on a portable terminal, on a computer, the computer program causing the computer to execute:

receiving the map image;

25 specifying a reference direction that is required when the map image received at the receiving is brought into correspondence with actual directions, based on a piece of position information that indicates a location point of the portable terminal;

30 generating a piece of reference direction information for having a user of the portable terminal understand the reference direction specified at specifying; and

displaying the piece of reference direction

information generated at generating, together with the map image.